

Squash

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Scientific Name and Introduction: Summer squash are the young fruit of *Cucurbita pepo*. They are members of the Cucurbitaceae family. There are six horticultural groups of Summer squash: cocozelle, crookneck, scallop, straightneck, vegetable marrow, and zucchini (Paris, 1986). Summer squash is cultivated throughout the world and is available year-round. Zucchini is the most widely grown and economically important Summer squash.

Quality Characteristics and Criteria: Tenderness and firmness are the major quality characteristics. The surface of Summer squash should be shiny; dullness is a sign of senescence. Fruit should be firm and free of physical injury. Dark green types should be entirely green; yellowish areas are a sign of senescence. Water loss results in a dull surface and loss of firmness.

Horticultural maturity Indices: Summer squash are harvested up to 1 week after anthesis, when they are still shiny in appearance. Small fruit are more desirable than large fruit because their flesh and seeds are tenderer and slightly sweet.

Grades, Sizes, and Packaging: Summer squash are graded U.S. No. 1 and U.S. No. 2 (Anon., 1984). Summer squash can be harvested over a wide range of sizes (< 50 g to > 400 g; < 2 oz to > 0.9 lb). Acceptable size is a function of the type of squash and market demand. Squash may be field packed directly into shipping containers or transported to the packinghouse in field boxes or bulk bins for washing and sizing before packing. Squash are packed in a variety of containers including bushel baskets, wire-bound wooden crates and fiberboard boxes (McGregor, 1987). A plastic liner should be used in all wooden containers to prevent abrasion and retard water loss.

Pre-cooling Conditions: Room, forced-air or hydro-cooling are acceptable methods for removing field heat from Summer squash (Lill and Read, 1982). Prompt pre-cooling after harvest reduces the rate of water loss and is essential for maximum postharvest life.

Optimum Storage Conditions: Summer squash are highly perishable and not suited for storage longer than 2 weeks (Hardenburg et al., 1986). For maximum shelf-life, Summer squash should be held at 5 to 10 °C (41 to 50 °F) with 95% RH.

Controlled Atmosphere (CA) Considerations: Storage in low O₂ atmospheres appears to be of little or no value for zucchini squash (Leshuk and Saltveit, 1990; Mencarelli et al., 1983).

Retail Outlet Display Considerations: Summer squash should not be stacked more than four layers deep and should be arranged carefully so they do not fall off the rack. The display should be refrigerated, but direct contact with ice should be avoided as it can cause physical damage as well as lead to chilling injury.

Chilling Sensitivity: Summer squash are chilling sensitive and should not be exposed to temperatures < 5 °C (41 °F) (Ryal and Lipton, 1979). However, variation in chilling tolerance among Summer squash types is great (Sherman et al., 1987; Suslow and Cantwell, 1998). Chilled Summer squash show surface pitting and decay rapidly at non-chilling temperatures, although damage may be absent during refrigeration. Chilled fruit have increased rates of water loss upon transfer to non-chilling temperature (McCollum,

1989).

Ethylene Production and Sensitivity: Summer squash produce low to moderate amounts of ethylene at 0.1 to 1.0 $\mu\text{L kg}^{-1} \text{h}^{-1}$ at 20 °C (68 °F). The rate of ethylene evolution is greatly increased in fruit that have been held at chilling temperatures (McCollum, 1989). Increased yellowing may result if green skinned Summer squash are exposed to ethylene (Ryall and Lipton, 1979).

Respiration Rates:

Temperature	mg CO ₂ kg ⁻¹ h ⁻¹
0 °C	24 to 26
5 °C	27 to 37
10 °C	65 to 68
15 °C	139 to 167
20 °C	153 to 175

To get mL kg⁻¹ h⁻¹, divide the mg kg⁻¹ h⁻¹ rate by 2.0 at 0 °C (32 °F), 1.9 at 10 °C (50 °F), and 1.8 at 20 °C (68 °F). To calculate heat production, multiply mg kg⁻¹ h⁻¹ by 220 to get BTU per ton per day or by 61 to get kcal per metric ton per day. Data are from Hardenburg et al. (1986).

Physiological Disorders: Summer squash are very susceptible to water loss. Shriveling may become evident with as little as 3% weight loss. Pre-cooling and storage at high RH will minimize weight loss. Squash can be waxed, but only a thin coating should be applied. Waxing provides some surface lubrication that reduces chaffing in transit. Summer squash skin is very tender; skin breaks and bruises can be a serious source of water loss and microbial infection.

Postharvest Pathology: Decay caused by fungal and bacterial pathogens can cause significant postharvest losses in Summer squash. The incidence of decay increases in fruit that have physical injury or chilling stress. Common postharvest diseases include alternaria rot, bacterial soft rot, cottony leak, fusarium rot, phythophthora rot, and rhizopus rot. Alternaria rot can be especially pronounced following chilling injury.

Quarantine Issues: None.

Suitability as Fresh-cut Product: Summer squash is frequently sliced and marketed in foam trays over-wrapped with polyethylene.

Special Considerations: All types of Summer squash are extremely tender and are injured by the slightest scratch, bruise, or scuff. The yellow and scalloped squash show scuffing clearly because the ensuing darkening is obvious on a light background. Summer squash should be handled gently throughout marketing; sorters and packers should wear cotton gloves to prevent fingernail cuts.

References:

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